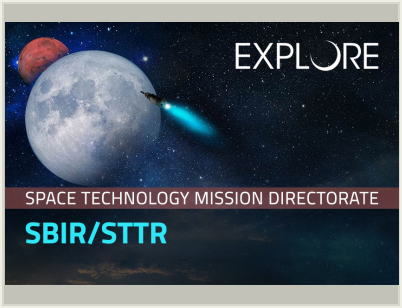
Virtual Satellite Integration Environment, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

Advatech Pacific proposes to develop a Virtual Satellite Integration Environment (VSIE) for the NASA Ames Mission Design Center. The VSIE introduces into NASA Mission Design Commercial Off-The-Shelf (COTS) Product Lifecycle Management (PLM) tools and processes, which haven proven themselves in the industrial manufacturing world. In addition to COTS PLM tools, the VSIE hinges on two key concepts: An enhanced Digital Mock-Up (termed DMU++) and the so-called Common Geometry Strategy. DMU typically addresses mechanical form, fit and function of a component or sub-assembly in the assembly context. We propose to go one step further and address electrical power, data, and other similar interfaces in the DMU to automatically detect compatibility issues beyond mere mechanical fit. This will be an enabling functionality for rapid mission design and integration of components from a database of existing off-the-shelf hardware such as the database currently under development at the NASA Ames Mission Design Center. The Common Geometry Strategy was introduced in the late 1990s in both the commercial aircraft engine and automotive industries, however, it has so far not found its way into satellite design or satellite mission design. The fundamental idea is that the same Master Model geometric information is readily available to all disciplines and individuals that need geometric information to perform their job. Since a particular disciplinary specialist may require only an abstraction of the detailed 3D-geometry, the idea of a "Context Model" is introduced. The Context Model is a simplified representation of the detailed 3D CAD model, which is simplified precisely to the level of detail required by the specialist, while maintaining full associativity to the Master Model geometry, so that it either automatically updates when the Master Model geometry changes, or at least notifies the specialist that it is out of date.



Virtual Satellite Integration Environment, Phase I

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

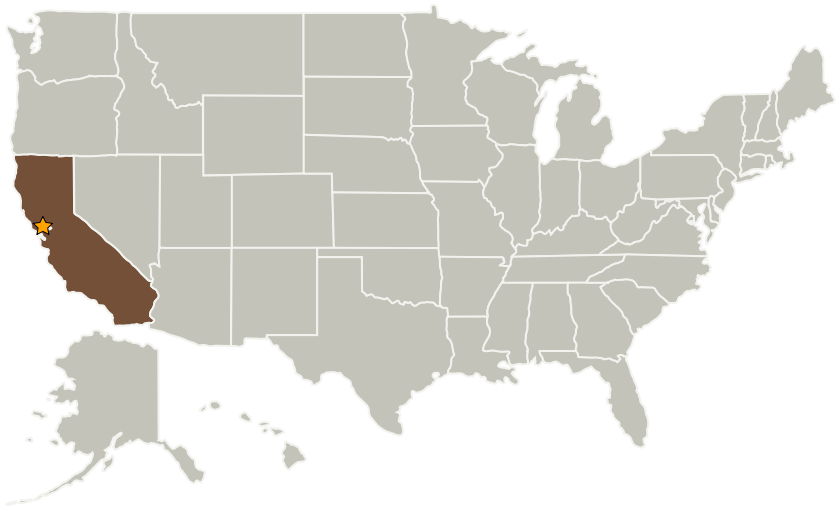
Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Virtual Satellite Integration Environment, Phase I

Completed Technology Project (2008 - 2008)

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Advatech Pacific, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	San Bernardino, California

Primary U.S. Work Locations
California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Peter J Rohl

Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.3 Assembly, Integration and Launch
    - TX13.3.2 Vehicle and Payload Assembly and Integration